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CLIMATE CHANGE AS A DRIVING FORCE FOR PRODUCTION OUTSOURCING TO THE DEVELOPING COUNTRIES

CASE COUNTRY: CHINA

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Abstract

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Climate change as a driving force for production outsourcing to the developing countries - case country China

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Abstract

Climate change is becoming everyday term. Man-made actions are pushing the environment to its limits. Mitigating the problem needs to address all problematic areas to get the necessary change. Outsourcing manufacturing has been one area, especially being neglected by those responsible for its occurrence. This thesis is planned to be an initiation for further investigation through indication of the neglected links.

To understand the situation, it is important to grasp more weightily of current climate change core reasons and consequences. Outsourcing manufacturing is one that needs careful attention. The global business trend continues to involve multiple countries around the world to participate on production through outsourcing. Complexity of mitigation increased because the geographical locations disperse of producers throughout the world.

Countries are categorized of being developing and developed and the production and consumption is discussed from these angles. The developed countries are outsourcing energy and labor-intensive productions to the developing countries. This being normal, the attention given to the climate burden while outsourcing in this context is the core issue of this thesis.

Global consumption crisis is presented side by side with electronics production in China. The demand keeps on growing rapidly and product supply generates environmental problems like hazardous materials, wastes and emissions. The sustainability is ignored in large extent.

The emphasis of the climate burden of outsourcing manufacturing is investigated from the existing academic literature. This will be a trigger for future detailed investigation about the real color of outsourcing and its impacts.

Keywords

climate change, outsourced manufacturing, sustainability, e-waste

CONTENTS

1 INTRODUCTION

Key Global Climate Indicators (KGCIs) describe the changing climate, providing a broad picture of the climate change at a global level that goes beyond temperature. They provide important information for the domains most relevant to the climate change, including the composition of the atmosphere, the energy changes that arise from the accumulation of greenhouse gases and other factors, and the responses of land, oceans and ice. Key Global Climate Indicators include the average global surface temperature, atmospheric greenhouse gas concentrations, ocean heat content, global sea level, ocean acidification, sea-ice extent and the mass balance of glaciers and ice sheets (World Metrological Organization 2020).

The climate change is happening both by natural cause and man-made problems. This thesis investigates man-made problems. Of course, human beings have become across a lot of changes in way of life. Industrialization is also part of the change. Industrialization changes are connected to that we produce and consume things in our daily life. Climate is affected by actions we take in acquiring, using and disposing of products. The ever-increasing human needs are pushing our climate to the age.

Global business plays a major role in making products available for consumers. One way of production is outsourcing partial or full productions to other locations across the globe. The developed countries mostly outsource productions to the developing countries. There is no wrong in these actions. The problem is how the production materials are sourced, processed and transported, that directly affect our environment. The thesis picks up China as a case country and example of electronics as a product to investigate and explain facts from existing literature.

Through this thesis, concepts like outsourcing, sustainability, global consumption, and the factors important for sustainability will be covered in a bird's eye view. The listed concepts are connected in a chain starting from the supply of raw materials and ending to the sales, dissemination and disposal. Every step, which the product passes, has its own impact on the environment. Production and disposal emit harmful substances to the environment resulting a devastating situation on the atmosphere. Some of the production process, components and disposal methods are being chosen only based on cost and resulted bad.

Outsourcing manufacturing's meaning for the emission release is that it is happening in another place. The developing countries don't have the necessary regulations and infrastructure to mitigate the problem. To increase consumption, as many as problems are

outsourced with the manufacturing processes. Both scenarios are not helping the climate change mitigation.

1.1 Thesis background

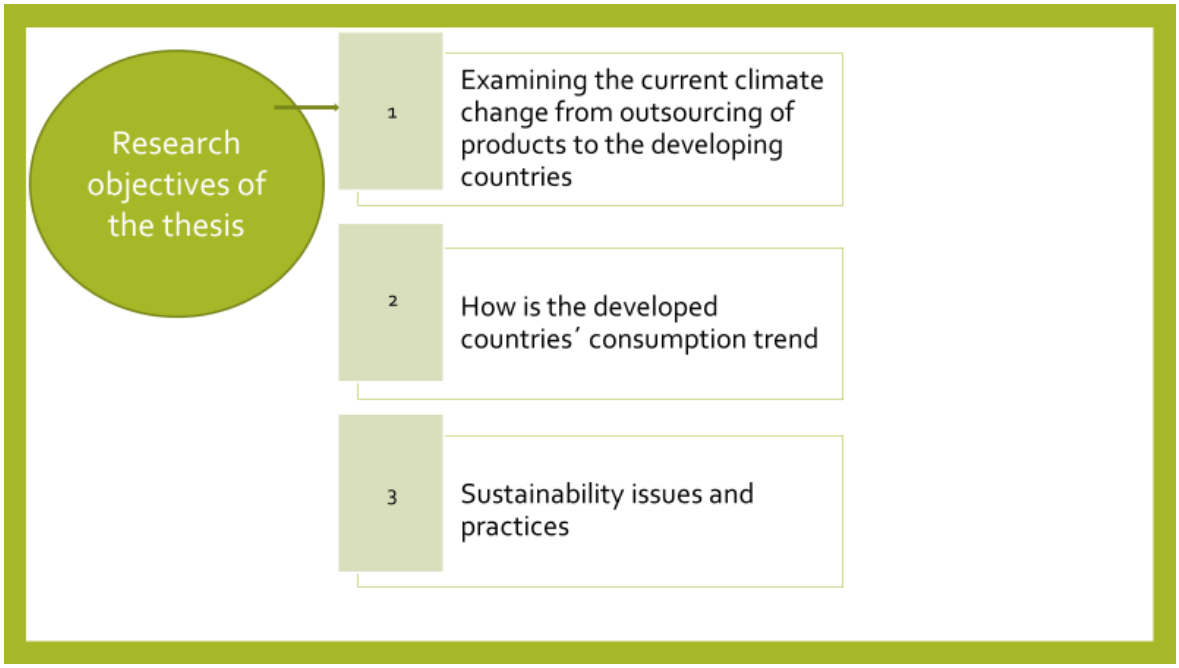
This thesis is about Climate change. Although, the term seems to be a household expression, it will investigate specific reasons behind the outsourcing of manufacturing and production. Climate change effects are seen with the global temperature increase, which is resulting to the continuous continuous disruption to our daily life. According to Auffhammer (2018, 2), first, climate change is a global phenomenon and hence local emissions result in global damages. The quantification of which is challenging as damages varies across space and time. Second, greenhouse gases are long-lived, which means that today's emissions affect generations hundreds of years for the future.

Global climate change has been occurring very slowly over thousands or millions of years (British geological survey 2020). This had been the perception and reality for some time. In today's globalized world, the pace of climate change is becoming rapid than ever before. According to European Environmental Agency (2020, 1) the start of the industrial era (about 1750), the overall effect of human activities on climate has been a warming influence. The human impact on the climate during this era greatly exceeds that known changes in better processes. Industrialization leads to more production and consumption of goods across the globe. People start to change their consumption behaviour once production enabled goods to be cheap and well available. This thesis investigates the role of the outsourcing production of goods as a contributor to the climate change.

Global business is changing and a part of the change is how the goods are produced with long supply chains. It is becoming difficult to identify the supply chain for a finished product as the chain becomes longer and involves multiple countries around the globe. Those countries have different standards for the production considering the climate change mitigations. The developed countries start to focus on how to mitigate the climate change without compromising the needs for production. They put strict regulations to be followed in the production. In due time, businesses have become more global and start to outsource their production to the developing countries. This only mitigate the climate burden in their geographical location. In this way the harmful production practices have been outsourced to other countries with less regulations on resource use and waste disposal.

1.2 Thesis objectives and research questions

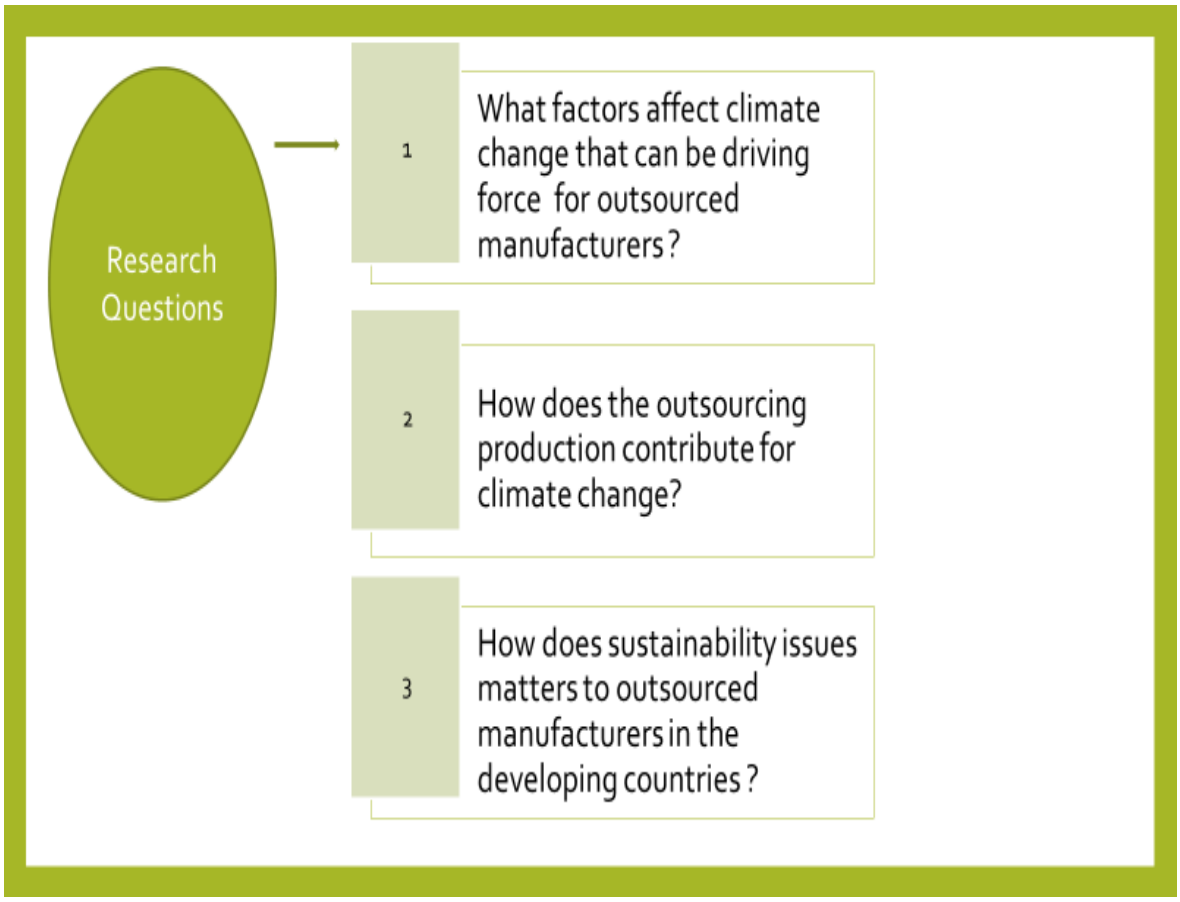
The thesis objective is to look into the impact of outsourcing manufacturing to the developing countries on the current climate change. According to The Guardian (2011, 1) cuts in carbon emissions by the developed countries since 1990 have been calculated out many times over by increases in imported goods from the developing countries. This indicates that the global climate is affected by more carbon emission coming from the developing countries taking turn on the production of goods. In broader sense, the thesis also includes the developed world´s consumption and the concept of sustainability to magnify the problems and draw some conclusions.



Picture 1. Research objectives of the thesis

First, by answering to the research questions, we would get a clearer picture of the driving force of the climate change being treated differently between the developed countries and their outsourced production host countries. Second, it will demonstrate outsourcing manufacturing and its consequences along the supply chain. Third, how far do the developing countries consider sustainability issues in their current production.

The research questions are listed as follows:



Picture 2. Research questions

1.3 Theoretical framework

The theoretical framework for this study encompasses concepts like climate change, sustainability, global business environment, consumer consumption trends and climate change concept in the developing countries. The main agenda is the climate change reasons caused by the outsourcing manufacturing in the developing countries. However, it is inevitable to single out only outsourcing manufacturing as it will not lead to acceptable solutions. Sustainability issues in the more globalized business environment is also an integral part in tackling the climate change.

1.4 Thesis structure

The thesis report is comprised of the following parts.

Introduction, which gives the general idea of the thesis. It includes parts like research objective, research questions, structure of the document, theoretical framework and limitations and scope of thesis in a general way, and, is followed by the literature review, the second part of the thesis, where various sources are covered about the topics like climate change, difference in climate concern between the developed countries and developing countries, current consumption trends and sustainability.

Methodology is the third section of the thesis describing the case countries and productions experiences with identification of the resources needed and consumed. Then follows empirical study and analysis, the fourth part, which answers to the research questions using qualitative research methods. The limitations of the research is also explained.

After that, the discussions and recommendation for the future research are presented, which brings added information value for the climate change mitigation. It explains personal perception and shed light for a part of the issues in fighting against the climate change. Finally, conclusions, summary of the study and future recommendation for research are reported.

1.5 Scope & limitations of the research

The scope of this research is not limited considering the nature of the topic. Climate change is affecting human beings and the whole nature all over the world. The current rate of the climate change must be mitigated to keep the environment favourable for the future generations. Most of the climate changes didn't came overnight and cannot be eradicated by the short-term solutions only. The recommendations of the research can be used in the future researches in planning, producing and using of the products by modifying it to specific locations.

The limitation is to find direct and honest response from the companies in question. This leads on the research entirely dependent on the secondary sources to draw conclusions. This is the biggest limitation of the study. However, it will try to look from a different angle to existing and threatening problems.

2. CLIMATE CHANGE

The climate has always been changing. On every time scale, since the Earth was first formed, its surface conditions have fluctuated. The past changes that have attached on the landscape, have influenced on the evolution of all life forms and are a subtext of our economic and social history. The current climate change is the key part of the debate about the consequences of human activities on the global environment, while the future course of the climate may well exert powerful constraints on economic development, especially in developing countries. (Burroughs 2007, 1)

Long-term climate change effects often receive less attention than immediate concerns in the government organizations, since effects may be slow in evolving and fail to have the immediate impact that political entities require. One example of this challenge is the onset of the Climate change. Strong natural phenomena, such as earthquakes or hurricanes, influence communities to prepare for what is considered an inevitable occurrence of these natural disasters. In contrast, the climate change is influencing political discussions, but decisions are generally being delayed as greater certainty in the potential effects is developed. Despite the continuing studies on potential long-term effects, many government organizations remain in the study stage rather than moving to any form of action to mitigate the potential effects of climate-based issues. (Chinowsky et al 2011, 1).

It is now over one hundred years ago that climate change was officially discovered. The pioneering work in 1896 was done by the Swedish scientist Svante Arrhenius, and the subsequent independent confirmation by Thomas Chamberlin that human activity could substantially warm the Earth by adding carbon dioxide to the atmosphere. This conclusion was the by-product of the other research, where the main aim was to offer a theory, where by decreased carbon dioxide would explain the causes of the great ice-age, a theory which still stands today, but, which had to wait until 1987 for the Antarctic Vostok ice-core results to confirm the pivotal role of atmospheric CO2 in controlling past global climate (Maslin 2014, 2).

Nowadays the climate change seems to be a household term due to extreme fluctuations to the nature. Most of us are familiar with the term climate change, but few of us understands the science behind it. We don't fully comprehend how the climate change will affect us and for that reason, we might not consider it as such a pressing concern like housing prices or unemployment (DiMento & Doughman 2014, 18). The climate change is a 'wicked' problem bound up with problems of population growth, environmental degradation and world problems of growing social and economic inequality (McNall 2011, 1).

Different articles had shown how the climate change had been undermined on how it affects everyday life. The climate change is the cause of the ruined ecosystem and because of that, also responsible for food insecurity, water shortage, mass migration and political instability as well. (McNall 2011, 6). Some articles try to describe the climate change from only a narrow angle. The term `climate change` and `global warming` have been used in a conflicting manner. Global warming is an oversimplification of the current changes of the earth climate and unidirectional. Furthermore, some people are denying the change accelerated by the human activities. (Post 2013, 3)

To mitigate the climate change, the IPCC (Intergovernmental Panel on Climate Change) was created in 1988 under the auspices of the UN. Its aim is to make scientific studies about the causes of the global warming observed over the course the 20th century and how it is going to evolve in the future, it's human and environmental consequences and subsequently to give a rise to appropriate political decisions. (Larminat 2014, 1). This kind of organization needed to be formed and push the agenda for such discussions, which would result in measures of correcting actions in a global scale.

The climate change mitigation must start by identifying the root cause of the problem. As stated above, there are controversial conclusions to what really creates and accelerates the climate change at a global scale. According to Kininmonth (2004, 1) it was concluded that there is a need to combat the perceived dangers of the global warming that would result from increasing the so-called greenhouse gas emissions to the atmosphere. The greenhouse gas concentrations, particularly those of carbon dioxide (a product of burning coal, oil and other fossil fuels) are increasing as a direct consequence of the range of human activities including industrialization, land use practice and transport.

In addition to the carbon dioxide (CO2), a water vapor is also known to be a strong greenhouse gas. Its atmospheric concentration is much higher than of CO2 or any other greenhouse gas. However, greenhouse effect is required for life to. The main challenge is how to manage its concentration and production, but not to put the global climate in burden. It is known that the sun provides essentially all the energy that drives much about the earth´s climate. Part of the energy is reflected the space and the amount of this reflection is an influencing factor of our climate. The energy from the sun, which is not reflected to the atmosphere, is absorbed by objects at or near the Earth surface. The Earth´s surface also radiates long wave radiation to the space. Some of this long wave radiation is captured by the greenhouse gases, mentioned above. The collision increases atmospheric temperature and surface temperature resulting to the devastating climate change. (Sondergard 2009, 17).

According to Maslin (2014, 136), we need the greenhouse effect because without it the earth would be at least 35 Celsius (C) colder, making the average temperature in the tropics about -10 Celsius. Since the industrial revolution we have been burning fossil fuels (oil, coal, natural gas) deposited hundreds of millions of years ago, releasing the carbon back into the atmosphere as CO2 and CH4 increasing the greenhouse effect and elevating the temperature of the Earth. This helps us to understand how to manage the amount released back to the atmosphere rather than putting them in the category of harmful substances.

2.1 Global climate change

The history of the 21st century may well be determined by our ability to control the threat of the climate change while bringing the benefits of the development to all citizens of world. There is a growing hope that we can accomplish these two linked objectives. Countries around the world are presently working towards a new climate agreement and a new set of sustainable development goals. There is a real opportunity of getting into cleaner, more resilient economies, providing prosperity and security for this and future generations. (Harris, 2012, 65). Currently the developed world has started to implement more strict rules towards the climate change. However, the climate change phenomenon is a global issue. According to Harris (2012, 67), there are different ways to achieve the required emission reduction, but all of them involves the change world energy system.

The theories of reduction emissions seem easier to say than to implement in practice. There is so much difference in energy production and its' use between countries. Since the start of the industrialization era, possible recommendations have different implications in a global context. Maslin states (2014, 136), the most sensible approach in preventing the worst effects of climate change would be to cut carbon dioxide emissions. Scientists believe that the cut of between 60 - 80% is required to avoid the worst effects of global warming. But many have argued that the cost of significant cuts in fossil-fuel use would severely affect the global economy, preventing the rapid development of the Third World. In addition to this, the developed world shifted the carbon emission with consumption while restricting emission levels on productions of goods.

The developing countries' economies are still depending on subsistence farming. As the number of populations increases, the need for land also increases and leads to the deforestation. According to Halder (2011, 11), human beings had first affected global climate some eight thousand years ago, with the start of agriculture. Due to cutting of the forests for agriculture, the amount of carbon dioxide in the atmosphere increased drastically. The

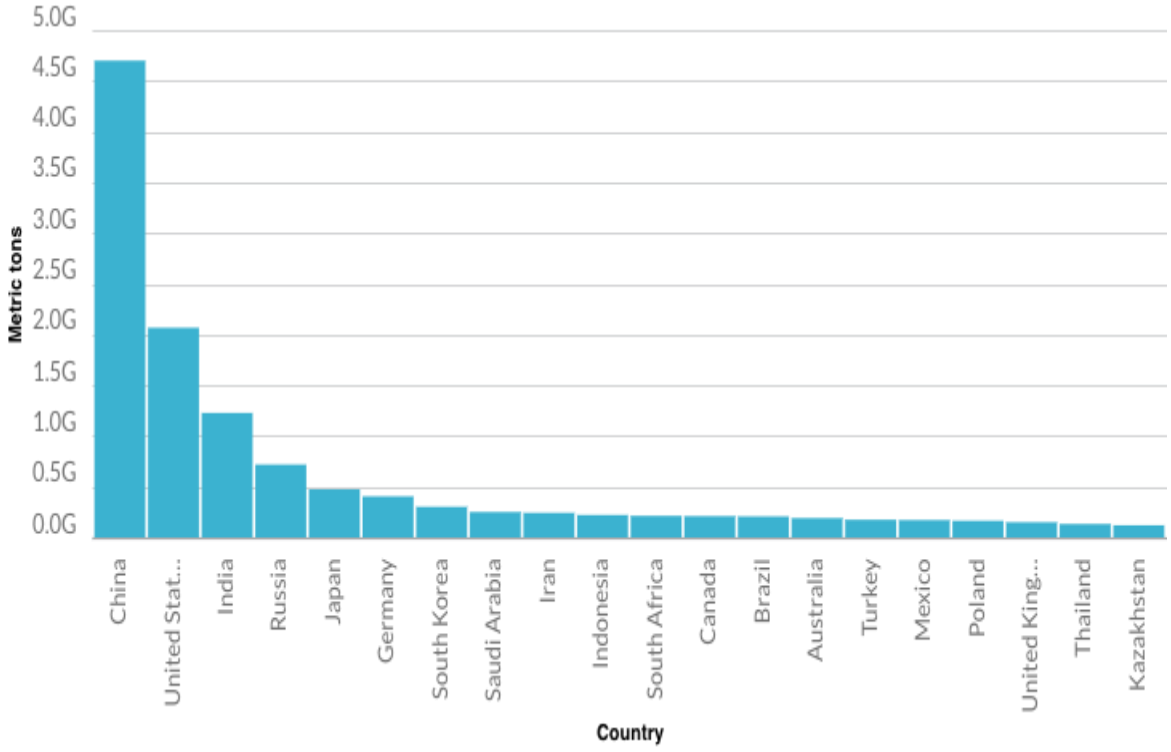
forest helps to consume carbon dioxide and give out oxygen to the atmosphere and create a balance.

The above-mentioned causes of the climate change are still affecting the environment, but one stands out from those in a visible way. The first fundamental global warming cause is an absolute dependence of the modern human society on the burning of the fossil fuel. The focal point of this is the generation of energy for the use in the industry and consumption sectors. Carbon dioxide is the main byproduct of burning fossil fuel. (Halder 2011, 13).

Fossil fuel production and consumption has been difficult to avoid because it is the most essential sources of energy both in the developed and developing countries. There had been lots of attempts to address the issue by the international bodies like the United Nations, but the result had not been at the expected level. Cassidy underlines (2019, 1), that even if renewable energy is growing rapidly around the world, fossil fuels still make up most of the world's energy use. In 2017, 81% of the consumed energy in the world were oil, coal, and natural gas.

Nearly 15 billion tons of fossil fuels are consumed daily. Three countries use more fossil fuels than the rest of the world combined: China, the United States, and India. Together these countries consume 54% of the world's fossil fuels by weight, according to the global material flow database developed by the UN Environment Program. The graph shows how countries stack up in terms of fossil fuel consumption. Consumption includes extraction within the country and imports, minus exports to other countries. (Cassidy 2019,

1).



Picture 3. Fossil fuel consumption by country (cleantechnica.com)

The wealth of the industrial nations has been built on a relatively cheap fossil fuel. First, the foundation of the development was coal, then crude oil and natural gas. All these fossil resources were welcomed as a blessing and appreciated as a source of wealth and prosperity (leggewie & Mauelshagen 2018, 4). Now the developing countries are following the footsteps of the industrialized world and increasing the use of fossil fuel at an alarming rate. Most of the developing countries are on the process of changing in economy and social behaviour resulting ignorance on the current and future effect of carbon on climate change. In addition, industrialized part of the world is being accused not to take climate action in a faster pace and still involve in production of carbon

Carbon dioxide is the main green house gas emitted as a byproduct of the fossil fuel combustion. CO2 emissions are the most important and immediate climate change cause of the global warming. Some of the carbon dioxide is transferring from the atmosphere by the carbon sinks, such as tropical rainforest and oceans, as part of the process of carbon exchange between the atmosphere and the Earth. Burning fossil fuel is to return the carbon dioxide to the atmosphere thousands time faster than the rate at which it is removed by forests resulting the nature being unable to remove in due time. (Halder 2011, 13). In

addition to this, human beings in the developing countries cut forests to expand farming lands, which also results lower absorption of the carbon dioxide.

Carbon dioxide is not the only cause responsible for the climate change through global warming. Its impact can be magnified also by the water vapor. One of the most important gases affecting the global climate is both incredibly familiar and persistently mysterious water vapor. Researchers know that atmospheric water traps heat and insulates the Earth, but even after years of intensive study, the magnitude of the effect has remained obscure. Warming, driven by carbon dioxide and other gases, allowed the air to hold more moisture, increasing the amount of water vapor in the atmosphere. (Laurie 2010, 1). Water vapor, as a greenhouse gas, shall be quantified to know the impact of all other greenhouse gases. (Sondergard 2009, 43). Quantifying water vapor is not part of this report. It is mentioned to show there are additional greenhouse gas effects, not yet discussed and researched that much, resulting to the global temperature change and finally affecting the climate.

Agriculture also can affect and be affected by the climate change. Agriculture sector is involved in the climate change especially by its gas emissions and land use. Big farms use lots of fossil fuel and contributes directly to the amount of greenhouse gas with different practices like rice farming and raising livestock. Accordingly, land use and agriculture come second and third after the fossil fuel. Considering land use, agriculture contributes to the CO2 emissions related to deforestation, methane releases from rice productions and nitrous oxide releases from fertilizer application. Livestock also uses fuel intensive productions and emit greenhouse gases. It contributes at two stages: first, being deforestation and, second, being producing greenhouse gases by crop production, feeding animals and treating their waste (Halder 2011, 65).

On a global scale, agriculture has different impact. In the developed world, farming became more mechanized and production level increased during the time. One way to win the competition was utilizing technology and increase productivity. This helps counties to sustain their needs and export to other places. Although, it seems to be good, it is accomplished at the expense of Climate change. In the developing countries, it is the other way around. Productivity didn’t increase, but the need for land space increased and resulted in deforestation limiting the CO2 intake of the forests.

Fossil fuel is mentioned many times in this thesis and most of the used literal sources clarified its importance and its by-products affecting the climate. Manufacturing industries are also consuming huge amounts of fossil fuel starting form sourcing of raw materials until delivery and use of the actual products. According to Claussen (2001, 323), the challenge for the manufacturing industry is to develop means of meeting the ever-expanding needs of growing demand while reducing the environment impact of the production process. The concept often refereed as a part of sustainable development. Manufacturing must be sustainable if we want the next generation to prosper in the future. In the next chapter, the effect of outsourcing manufacturing on Climate change will be covered.

2.1.1 Climate change in developed countries

There is a practical reason to investigate the climate change causes, effects and future predictions in relation with the economic development. There is no easy way to categorize every country in the world explicitly. However, the general perception of the developed world vs developing world is the difference in industrialization, infrastructure, living standard and income per capita. As mentioned, this research examines the past, current and future trends of production and consumption of goods, which are directly related to the global climate change.

For this thesis purpose, countries are categorized into two groups being developed or developing. The classification helps to understand the flow of outsourcing manufacturing from the developed countries to the developing countries. In addition, the category used to explain Climate change effects due to production and consumption in different countries.

It is quite evident that people want income-growth and prosperity. Once their income increases, they like to consume more adding pressure for governments in finding a way to satisfy peoples demand. The political challenge is to combine low carbon productions with the growth and expansion. The challenge is not about cutting back the growth but finding a way to alien lower carbon emission. Unbridled industrialization and competitiveness lead to a profit making by lowering cost of products. The unregulated engines of growth and market forces alienates and marginalizes several sections of the society. The same force disturbs economical balance by discharging greater carbon emissions through increased number of cars, high oil exploitations, consumption and conversion of forests and farms into exclusive industrialized zones, forcing displacement of people and disturbance in absorbing carbon dioxide. (Saigal 2010, 50). These changes are inevitable and will continue

in the future as development levels of countries is changing or shifting their dependencies on the carbon emitting materials and procedures.

The global climate change was originated and pushed more by the industrialized countries. According to Saigal (2010, 50), when calculated on per capita basis, high-income countries are responsible for at least five times more greenhouse gas emissions than low income countries. Although the high-income countries produce more greenhouse gas, poor countries bear the burden of climate change disproportionate to what they emit. The industrialized nations also lead in use of fossil fuel, which according to Halder (2011, 13) is the main source of carbon dioxide affecting the climate in great deal.

It shall not be a blame game between the developing and the developed countries about causing more damage to the climate, instead to identify the main reasons and locations for tackling the problem. The next chapter of the thesis examines the shift of productions of high carbon emitting products from the industrialized part of the world to the developing countries. This only shifts the problem and not reduces the amount of greenhouse gases. The difference in the living standard of countries also pushes on how to follow environmental regulations to be carbon conscious with less effect on international trade.

Back in the old days, industrial revolution was initiated radical change in a way of production technologies which fundamentally affect the nature of production. Manufacturing became the main engine of accelerating economic growth in the 19th century (Szirmai et al 2013, 7). This statement explains the start of the industrialization era and accumulation of green house gases over a long period of time. The categorized developed countries have been pioneering in changing the manufacturing trend and start to utilize more resources with a positive intent of building competitive economy.

The developed countries had the history of starting the industrial revolution and continued until the late 19th century where the emergence of concept of global value chain was created. According to (Szirmai A et al 2013, 7), global value chain means being a part of the production of goods along the worldwide supply chain. Let's not to forget that the developed countries had already started using manufacturing processes responsible for higher greenhouse gases and climate change was not an important issue. The main thing was to increase productivity and to be competent in manufacturing goods. Later the developing counties started to join the long global value chain and participate in the production of goods. Less emphasis was given on the environmental issues and the focus was only on increasing productivity.

Creating of global value chain has both advantages and disadvantages. The advantage is that countries can be productive and participate or be part of production of goods just by specializing in specific components. Through this process, companies became multinational and more globalized compared with those that just acted locally. The disadvantage is that companies and countries have lost their control over resources and continue being part of production with less emphasis on Climate change. The race to stand out in the globalized world led to friction over Climate change protection. According to Peter (2016, 28), globalization can be violent and exploitative, little different than imperialism. Manifestation include world powers forcing the developing countries to deregulate economic affairs, offering grants and demanding loan repayments to open borders to trade, natural source investors and foreign manufacturers resulting rising external debt.

The developed countries also have local climate issues caused using fossil fuel. One of the profound reasons for Climate change is the release of carbon from the use of fossil fuel. It can be shown with a simple thought of experiment in a daily life activity involving burning of fossil fuel. Using your car to go to work is an obvious case. Burning fossil fuel is what the car engines does. Expansion of public transport had been suggested and implemented with different source of energy like electricity. Even if the energy source is renewable, environmental problems still exist, problems are of different origin and solve the problem only partially. Construction is another example. Carbon is released while using the materials, during building and even after it is finished. The heating and electricity might be supplied from fossil fuel burning plant. (leggewie & Mauelshagen 2018, 4). These examples clearly indicate the difficulty of avoiding fossil fuel in a short term. Although, the examples represent the developed world, every region has different production and consumption pattern.

The developed world is a victim of its own success. According to Constanz (2013, 51), almost all economic policy has focused on entirely promoting continuous growth in gross domestic product (GDP). This growth often leads, instead of better consumption, into growing use of material and fossil fuels and increasing amount of waste. The culture of consumerism has developed, in part at least as means of enhancing consumption-driven economic growth. Still, some countries need to produce excess to keep their local economy going on and to be competitive in the global market.

As it was mentioned, some developing countries are always on the ladder to the developed side. Most of the countries in transition are also characterized by large number of population and increasing middle-class. According to World Bank (2008, 3), consuming more means the climate will be under more stress. It is impossible to stop people from

consumption of goods, but it would be advisable to encourage responsible consumption for the better future.

In Industrialized countries, climate change policies and researchers have traditionally focused more on green-house gas emission related to production than consumption. Some rich countries start to decrease emission level within their boundaries by substituting of products through importing than producing (Bhaskar et al 2010, 85). However, this only transfers the emission to another location and overlook the climate burden arising from use of the products locally. Disposal of the by-products of imported items are also creating problem. They tried to transform to the re-use of materials in accordance with the circular economy principle, but the change is very slow.

2.1.2 Climate change in developing countries

The developing countries are categorized by having a continues development need in economy, population size, consumption behaviour and extreme poverty at the same time. Until today in these countries a half population is living in extreme poverty, while the other half face the change in terms of infrastructure, industry and consumption. Climate change effects makes the challenges in the developing countries more complicated through impacts like drought, floods and more strong storms. These impacts pose a sever challenge for development (World Development Report 2010, 1).

The effect of the climate change is expected to be the greatest in terms of loss of life, relative effects on investment and the economy. The populations and communities have lesser capacity to adapt and are more vulnerable to the climate change. The developing countries must fully understand the vulnerability of the nature. They need to understand the adverse impacts of the climate change and implement strategies to cope with it. (Ravindranath & Sathaye 2002, 64). The developing countries will bear the burnt of the effects of climate change, even as they strive to overcome poverty when their venerability erodes hard-won economic gains and prospects of development. (World Development Report 2010, 1)

The developing countries find it difficult to address the climate change challenges as it requires from the countries to confront their energy needs and energy security concerns, which, in turn, impacts on their respective national socio-economic developmental plans. The linkage between lack of access to energy services and diminished opportunities for economic productivity have been recognized as a mutual reinforcing component. (Cherian 2015, 13). According to International Energy Agency (2019, 1), most of the developing

countries has a problem of accessing energy needed for growth and development. To make things worse, there are lots of people, who burn woods and manure just to get their daily energy use fulfilled. The climate change mitigation seems luxury for those, who don't have access to the needed energy.

According to Cherian (2015, 11), many poor communities in the developing countries, in the Asia and the Africa, have no access to safe and reliable energy and pay disproportionately high prices for inefficiency and health problems generated by the energy sources. According to Radulescu et al (2016, 2), once the countries face the impacts of the climate change, they face the double challenge: worst weather pattern transformation and lack of resources for the implementation of adaptation measures.

The developing countries are significant emitters of greenhouse gases because of burning forests for land clearing and burning of non-renewable biomass for cooking and another household uses. The historical contribution of the developing countries for the global greenhouse gas concentration has been small, but it is increasing at an alarming rate with some economic and population growth. (Ravindranath & Sathaye 2002, 97). These countries are making two mistakes. Once they burned the forest, the first batch of greenhouse gas will be emitted, and, another batch will follow, when they use the land to grow things that will have less importance for protection of the climate.

The above-mentioned statements might not include all the developing countries. The term "developing" includes wide range of countries and not all of them being in the far extreme end of poverty and lack of energy access. However, there are countries categorized as developing, but, indeed, are changing and trying to industrialize. Through this change, some countries are trying to mitigate the climate change along the developmental stages. According to Ravindranath & Sathaye (2002, 97), the developing countries dominate the mitigation opportunities in the forestry and agricultural sectors. Mitigation option to reduce methane emission in agriculture must encounter problems peculiar to these countries like small land and livestock holdings, substance nature of their activities, lack of support, lack of technical capacity, policy environment and financial resources.

The developing countries can overcome many of the hurdles to mitigate the climate change and pursue with short term strategies. However, to pursue long term and environmentally sound technology path, they need assistance and corporation form industrialized countries. (Ravindranath & Sathaye 2002, 99). According to WORLD BANK (2008, 30), many industrialized countries are concerned about the potential impact that mandatory carbon reduction targets would have on their economies. Among these concerns is that

any plan that exempts the developing countries from emission limits would not be effective, because carbon intensive industries would simply shift their operations from one of the exempt countries to another with less environmental regulations. This issue concerns the main aim of this thesis.

Climate change policies must deal with essential nature of our production and consumption patterns, which is recognized as global development challenge. Mitigating the effects of the climate change will necessitate measures in all sectors. It is envisaged that efficient and cost-effective means of mitigation and adaptation would make use of economic instruments. (Cottier et al 2009, 16).

2.2 Climate change realities and global business environment

This chapter is about the current situation of the global business activities towards mitigating climate change. The climate change by itself creates opportunities and threats. Global business can utilize the opportunity to create way of production and consumption while increasing profitability. It can be having products with less harmful wastes or production processes. However, currently the threats seem to be overlooked, especially by those struggling to make the ends meet. Human needs across the globe is not same and it is difficult to implement similar strategies even in same industry.

The primary objective of a business is to make a profit. Generally, goods are produced using manufacturing process and inputs like natural resources and labor. The profit generated will be reinvested in further production in a continuous process of accumulation. It is a system, that rewards short-term gains even in a business with relatively long-time horizons. This shortly drives the global trade to grow as well as consume natural resources at an alarming rate with the thinking that materials will exist forever. (Farely & Smith 2014, 123). In my opinion, this thinking only focuses on economic gains and gives less value for the climate change. It is one way to show how unsustainable the world becomes.

The realities of the climate change are usually communicated by two directions. One is science and the second is media. Science is often privileged as the dominant way through which the climate change is thought to be understood in a meaningful way. This can be attributed in part to the thinking as well as partly to how long-term trends that emerge as evidence of the climate change are difficult to access through day-to-day observational trends such as weather change. However, scientific understanding of the climate change is embedded within a matrix of cultural, social political and economic process that makes

Climate change meaningful in our everyday life. (O´Connor, 1999, 671). On the cultural aspect, our culture and values inform how we assess, comprehend and communicate about complex issues such as climate change. We know that scientific papers, policy evaluations and media representations are not viewed simply as reified markers of culture. (Crow & Boykoff 2014, 2).

According to Crow & Boykoff (2014, 2), there is obvious point that most citizens around the world typically do not read peer-reviewed literature nor they read policy documents or negotiate international treaties. Instead to learn about the climate change and gain climate information, people in different countries turn to media communications, tv-channels, newspapers, radio, digital and social media communications. Media consumption is totally different between the developed world and developing world. In the developed world, there are more free medias addressing climate change issues to the general public. In the developing world, the media is censored and mostly used by governments to manifest political issues and the general public does not get relevant information. Although, there are gradual changes in communication, the future still looks gloomy.

Citizens used to get a glimpse of general information on how countries are supporting their growth at the expense of the climate change. The world entered a period of exceptionally fast economic growth. The rapid growth goes hand in hand with increasing resource use and a pressure on the environment. Population growth is also a reason for increasing production and consumption. Global business came with the blessing of getting things cheaper and conveniently. Cheaper price and conveniences are achieved through using energy sources with higher harmful emissions to the environment. The developing countries' citizens seems to ignore the mistakes of the industrialized countries and focus on just short-term profits.

Global business leader corporations became more influential on decisions even at the government level. The evolution of business lobbying effects on the climate change demonstrates, how business representation has increased at the international level while becoming more diverse as the global environmental agenda has expanded. International regulation creates various effects on business, related to the climate change as much as to other environmental areas. As the number of politically engaged business actors increases, so does the potential for divisions within the business community. Overall, the business sector possesses superior financial resource and organizational capacity to delay climate change issues until becoming dominant in their field. (Ougaard & Lender 2010, 200). These powerful corporations still use those energy sources, which harm the environment continuously.

Corporations have benefited from the globalization of the business. It encouraged competition among companies and created products for the global population. (Jain 2003, 67). However, there are concerns regarding how these multinational operations involve corruption across the borders. For example, company A designs a product and looks for the cheaper manufactures in the developing counties and makes its product cheaper and wins the competition. Most of the developing countries do not have the legal framework for environmental regulations and the multinational company can overpass strict environmental standards if the product is to be made in those countries. The reality for the production country is that they can just write the regulations but need not to implement them accordingly. Some non-governmental bodies are trying to tackle the problem with creating awareness for the consumer to make reasonable choices. However, this only cannot save the planet from the negative consequences of the climate change.

Some of the items are needed in the production country and the export income to run the economy. Although, there is a bright side in earning income, there is also emission left at the production site, which will be a-long-lasting problem. The release of methane gas can be an example for externalized emissions. According to Jorgenson (2006, 15), there are activities, which contribute to per capita methane emissions. These include the production of beef and veal, oil and natural gas, and the use of biomass for energy. Some evidence is found indicating that cereal production, including rice, also affects significantly methane emissions. Export-oriented cattle and cereal production have increased substantially in the less-developed countries. Paradoxically, most goods produced in these sectors are consumed in the more-developed countries, which highlights the outsourcing of consumption-based environmental costs. Overall, these results underscore the necessity for considering the environmental impact of economic activities in general and in production processes.

Foreign capital has a built-in incentive to ignore environmental externalities in favour of maximizing profits. Widely accepted assertions about the beneficial effects of foreign investment need to be weighed against ecological concerns related to the scale, intensity and social organization of production. (Jorgenson, 2006, 15). The receiver of foreign capital is mostly struggling to sustain by themselves and it is difficult to put strict measure on better productions with less climate impact. Countries get short term gain with less regulated productions, harming the environment and ignoring the fact that it will fire back sooner than imagined.

Most of the business in question are transnational corporations, which have offshore subsidiaries or long supply chain. The developing counties are dominated by the corporations´ decisions. The influences are both locally and internationally. According to Falkner, (2013, 289), most big corporations extended their influence on the environmental policy of countries using methods like lobbying, market control and structural power. The extent of their influence in policies outcomes raise a question how they make impact of the decision makers at a government level. These gives them the monopolistic behaviour over markets and at the time being, they are just looking at shareholders profit only without including environmental impacts.

Trade liberalization across the globe came as a benefit and drawback for countries. What was conceptualized by free trade supporters was, the liberalization had positive effect on the environmental side of business. However, environmentalists see the free trade as a main cause of environmental pollution in the developing countries. They explain the context of the climate change, which is sometimes seen as an unilateral effort to reduce carbon emissions, might shift industrial activity from the countries with strict regulation to those with lesser regulation famously know as carbon leakage (Falkner, 2013, 413). This is mostly what is happening in the developing countries. This does not mean that trade liberalization is completely a flaw, but it is an example of a loophole for big corporations to manipulate environmental protection regulations.

Big multinational companies still want to create a good image for consumers, non-governmental organizations and to governments as well. According to Haynes et al. (2012, 156), more and more companies are consistently trying to convince us that they are socially responsible and/or they produce reports, which identify their corporate social responsibilities, their citizenship or some other aspect of their social excellence. This should be focused by users' approach. However, some claims are extremely different form the reality.

Products get certified with international certifications to show they are complying with different regulations. According to Ougaard & Lender (2010, 201), one of the major internationally recognized certifications is the International Organization for Standardization (ISO). It is a non-governmental organization composed of national standard setting bodies. The standards are long believed to be open as well as to have an aim to achieve solutions that are scientific or technical, rather than political to assure the legitimacy resulting from standards. The ISO does not regulate or legislate, but companies voluntarily fulfill its conditions to show that they are capable to follow the standard requirements.

Acquiring ISO standards seems to be attained by big corporations on their diversified products. However, the issue of environmental protection is more beyond being qualified to get certification. It involves continuous involvement on each component of the supply chain, because the nature of today's global business is to have a long and widely dispersed supply chain. In addition to this, big corporations are involved in corruption cases in the developing countries to overcome some environmental regulations. They seek to create joint venture or representative, who does the dirty work and keeps it secret (Chen 2019,1). For example, some corporations make a business secret agreement with their supplier not to disclose their identity if environmental NGOs confront them with handling of waste. The developing countries lack strong legal framework to tackle such problems and have priority to create jobs for people at any cost.

2.2.1 Sustainability

The wide-range concept, sustainability, incorporates concepts of economics, social justice, environmental sciences, management, policy and regulations. It is to meet today´s needs without creating a threat for the needs of the future generations. In the sustainable development approach, forthcoming generations are acknowledged as stakeholders of the current generation and every corporation could create a negative/positive effect on ecological and social systems. In simple term, it means that every company, being local or global, must work towards preserving environment. (Gonzalez-pirez & Leonard 2017, 26). Sustainability is not just about natural resources and ecosystem, there are strong ethical, social, political and economic aspects, that affect what has and will occur. (Blowfield 2013, 7).

According to Rabindranath & Sathaye (2002, 232), the term sustainable development has become a part of all climate change policy discussions at a global level. Sustainable development requires that the future generation have at least same quality as the current generation. However, the current situation makes it difficult to adjust accordingly. Sustainable development does not encourage the use of exhaustible natural resources. It involves careful use and finding renewable energy sources to continue growth and development. This concept is not acceptable for many developing countries since it seems to disregard their aspiration for the growth and development. However, sustainable development can not be achieved without careful use of resources.

It is obvious that the resources of our planet are being exhausted, and it became a limiting factor for growth and development. The concept of sustainability was created with the reason of the resources. One big example is extinguishing of oil. This resource has been the main driving force for the growth and development. It is still considered to be the easily available energy source. However, regarding finding sustainable energy source is not going with the pace the fossil fuel reserve being depleted. (Aras & Crowther 2012,2). Oil, for example, is currently a reason behind wars and conflicts. Its growing use has led to opposite direction from the sustainability development.

In this thesis much of the ideas are considered from two groups of countries being developed and developing. In a global context sustainability issues pose difficult questions like how countries in these different categories prioritize their sustainability goals relative to their other current goals. The developing countries and those in transit to be developed, must see if the concept can align with their current growth plan. The developed world, on the other hand, must see how to continue with different priorities. (Whitefield & Mcnett, 2014, 7)

According to Whitefield & Mcnett (2014, 12), in the early times, sustainability was looked by the companies only on their own operations and measured the environmental and societal performance in a narrow way. They used to check how much less energy, water and other resources their factories consumed in each year. Today´s companies realize that the entire supply chain needs to be examined to address sustainability issues. The supply chain extends to direct and indirect suppliers, distributers and even to consumers. Consumers are the end users and disposers of the products. Products do harm the environment if it is not properly disposed. According to Szirmai et al. (2013, 7) the global supply chain became very long and involve multiple countries, which needs to consider sustainability in every step.

Managing sustainability in a global scale is difficult as any activities involving multiple countries. According to Whitefield & Mcnett (2014, 14), this complexity is described with three attributes naming multiplicity, ambiguity and interdependence. Multiplicity describes the increasing number of players or stakeholders involved in any issues, whereas interdependence describes increased level of interconnectedness and, ambiguity is an increased difficulty to give accurate meaning to information along the value chain. We now understand that not only global sustainability facing crucial challenges, but also the implementation of things to attain sustainability is becoming difficult in a global scale. (Sawa et al. 2011, 13). The meaning of sustainability has different interpretation along the supply

chain. Part of the businesses might do it for survival and others want to respect rules and regulations.

There is a dual relationship between sustainable development and climate change. On one hand, the climate change influences the key natural and human living conditions and thereby the basis for social and economic development. On the other hand, society's priorities of the sustainable development influence both on the greenhouse gas emissions that are causing climate change and the vulnerability. The wide range of the potential climate change impacts on sustainable development and vice versa, suggest that the linkages between these two topics need to be critically analysed. (Eissa 2017, 3). The biggest question concerning climate change planning and sustainability is, how to change behaviour so that people move towards the low carbon economy. Climate change is priority for very few of the world´s citizens. Most are preoccupied with daily survival, personal advancement, family and community life, and/or the perceived need to conform to social norms. Somehow, this attitude must be formulated, and the climate change and sustainability must become a priority for most as we are heading to difficult times to utilize leftover resources. (Wheeler 2004, 113).

There is an argument on how to proceed with being sustainable and continue growth. According to Eissa (2017, 63), the question is how the developing countries with economic and social problems and economic reform plans that require further development, can meet their commitments to reduce greenhouse gases, and, at a time, when they want to achieve more economic activities. Current experiences show us, how the developed countries have been consuming energy sources derived from fossil fuel to sustain the development. Clean energy sources are not yet fully utilized to sustain economies across the globe. Although, this is the realty on the root level, Eissa (2017, 63) suggests, the developing countries should strive to modernize their economic management systems and amend some laws and regulations, whether financial or environmental, which provide a flexible and appropriate environment for sustainable growth.

The term sustainable development must be a leading principle for the future. Until recent times, global businesses find it easy just to follow their plan regardless of the harm on the climate. According to Sawa et al (2011, 27), economic globalization has been the driving force which changes to the global environment. It has also been a result of the world-wide spread of industrialization and economic growth. Unfortunately, not all countries have been benefiting from this industrialization. Some countries were just providing the raw materials for production and still could not get progress from that stage on. The forerun-

ners developed notations rip the benefit and now are pushing the agenda of environmentally sustainable development across the globe.

Global businesses are in competition and sustainability issues still cause frictions across the borders. A lot had been suggested to improve sustainability through preserving the environment, using renewable energy and conscious consumption. According to Schaltegger & Wagner (2006, 34), the core of argument on this topic is that environmental performance harms economic performance. For example, environment is a production factor both as a source of raw materials and energy and as a sink or pollution and waste. Improvement on these factors means an increase in costs and higher prices putting pressure on profitability of businesses.

Installing and operating pollution control or clean technology is an obvious source of cost increase. Capital investments, such as machineries, equipment, buildings, as well as operating costs, such as energy, labour and materials are likely to seen as a normal part of business operation. Environmental performance can be improved simply through changing operating practices. (Schaltegger & Wagner 2006, 34). However, it still can be done as a part of strategic planning and be developed as a competitive advantage of the company.

Currently environment is being sacrificed for the economic growth. Environment distraction is not desired while considering sustainability. It is goods and services that are desired and environmental distraction arises as unintended by-product of the production and consumption. Consumer's preference is mostly to a much-needed level to avoid those thigs harming the environment. Consumers increased income leads to more heavy than modest consumption. (Ekins 2000, 318). Consumer spending and consumption will be covered in the next part of the thesis. Surprisingly, even the developed countries, which have the option of conscious consumptions, are moving to the different direction. The developing countries have much less privilege to consider sustainability of a products or services during production and consumption.

The developing countries are also struggling with the deforestation. The deforestation has a local and global impact on the climate by changes in the energy, mass and momentum fluxes between climate subsystems' energy reservoirs. Deforestation is also associated with CO2 emissions, as crops and marginal lands, that usually replace trees after land clearing and tend to hold less carbon per unit area than forests. (Longobardi et al. 2016,1). This creates problem for sustainable resource use. The land cleared will be used to grow crops and to be built for housing, which, by far, has less carbon intake compared to forests, which naturally stabilize carbon dioxide situation in the atmosphere.

2.2.2 Global consumer consumption

Now, the world faces shocking scarcity of natural resources as consequence of over-exploitation and pollution around the world. The signs of exhaustion of renewable and non-renewable natural resources are seen every day. Until now production has not been a problem than that of distribution. Most of the production problems are tackled with technology, but products, which are made in the global supply chains, face difficulties to find proper solutions for all members of the chain. The rapid growth of population in the developing countries creates availability of the cheaper labour, which means to make products cheaper. These different factors do not stop or even decrease the nature of consumption in a global scale. (Gonzalez 2008, 2).

In many mainstream consumer markets, convenience, habit and budget are currently more important and have an influence in the purchasing phase more than environmental concerns. In all phases of consumption, purchasing, using and disposal remains a large gap on environmental values. All consumed products are not just fulfilling the basic needs of humankind. They are also a means to show status, social identity and human habit. (Tucker et al 2008, 55).

Income is an especially demographic characteristic relevant to environmental conditions. Across nations the relations between economic development and environmental pressure resembles an inverted U-shape curve. Nations with economies in the middle-development range are most likely to exert powerful pressure on the natural environment, mostly in the form of industrial emissions. By contrast the least-developed countries - because of low level of industry - are likely to exert relatively lower levels of environmental pressure. These countries have different way of putting pressure by deforestation and unplanned settlement in urban areas increasing pollution. (Hunter 2001, 1). Population growth in the developed countries has not had the same effect on global demand as population growth in the third world countries. The high growth of third world population has not had a very significant impact on demand; on the contrary, the moderate rate of population growth in the developed countries has caused the most significant changes in demand worldwide. (Gonzalez 2008, 21).

Growth along the globe has been supported and participated in different modes of transport. According to Demidov & Bonnet (2009, 30), the transport is a major source of air pollution and greenhouse gas emissions around the world and its significance in this respect is increasing. The problems and issues related to the traffic are surprisingly similar in the affluent nations around the world. From the air quality perspective, road traffic is

one of the significant polluters since it emits large quantities of harmful chemicals close to populated urban areas.

Development and the demand for mobility go hand in hand and increase when income of the society increases. The main driver of the fuel consumption is the expansion of roads, but high level of national development is possible with very large difference in transport energy consumption. (Kopp et al 2013, 23). The developing countries are replicating the developed countries experience with additional burden of increases in population size. As the population size increases so does the pollution from the transport. Almost all the developing countries rely heavily on road transport as other means of transport are not so developed yet.

There happens to be a discrepancy with the expectation and realty in mobility of the big cities. For example, lets take bigger cities in a more developed country, having better connectivity with functional public transport system. Even the good public transport access did not reduce the number of personal cars on the road. Some people drive their own car that increases congestion and pollution. Those cities without proper public transportation do not have any choice but to use any available means of transport to move. This became a major source of pollution, since a significant part of carbon dioxide emission comes from energy production, industrial process and transport. (Maslin 2014, 11).

The business model of companies is also shifting with the consumption behaviour. Some products are made to last long and cost the consumer more when purchased. On the other hand, some products are made in a way to be used only for short time and then to be discarded. These types of products are sold at relatively cheap price and the consumer is expected to buy another one within a short time. Although, it depends on the type of product used, consumer consumption is continuously motivated with the availability of cheaper products. A good example for this is the clothing industry. Since no one wants to use a cloth for a long time, multinational clothing companies are making cloths cheaper and consumers use and change to another version when the fashion changes. The outsourced manufactured cloths make it possible for the companies to persuade consumers with cheap price and not to think environmental impact and other sustainability factors.

Excess consumption creates problems in two ends. The first is where the product´s raw materials are sourced and manufactured and the second is where it will be consumed. According to Constanz (2013, 51), export-oriented economies in the developing countries fail to enforce environmental and labour regulations in order to keep the price down and be competitive. The consumer in the other end of the world is not aware of some of the

conditions and continue to consume more. The environmental cost of excess consumption somewhat overlooked with consumers without enough information or on trust on brands.

Developing countries are yet consuming less per capita. However, we should not to forget, that there are new consumers of the developing countries. Many of these new consumers are living more like the wealthiest classes in the industrialized world. These new consumers now number in the hundreds of millions. They produce greenhouse gases through voluntary consumption at a pace and scale never experienced in the human history. While societies in the West are starting to make changes to limit their greenhouse gas emissions, the new consumers in the developing countries are going to the opposite direction. (Harris 2016, 124). The number might seem a lot comparing with the developed countries population, but it is small compared to the developing countries. It is also believed to increase accordingly with the increase in income.

Decrease in consumption in some goods and services can have a rebound effect leading to increases in consumption elsewhere. For example, people save money by driving fuel efficient car or by increasing energy efficiency of their homes, they may spend the savings on holiday flights which can have more green house gas emission resulting in net use of energy and creating pollution. (Constanz 2013,51). Aircraft emit a variety of greenhouse and other gases, including carbon dioxide - the most significant greenhouse gas emitted by aircraft - and nitrogen oxides, as well as other substances, such as soot and water vapor that are seen to negatively affect the climate. (Blumenthal 2010, 4).

Looking at the trend how people travel across the world, the emission will increase even if advanced technology would help the reduction of emission. People from the developed world have more spendable income and many spend it on travelling. Aircraft emission is not alone the one creating heavy problems. All the people are going to use different mode of transportation to and from airport, consume product and leave waste materials at their destination. These actions in aggregate cause pressure on the environment. This does not mean we have to stop aviation. This is to show the difficulty on how to manage the climate challenge. In many countries the economy is also dependent on the income generation through expansion of aviation.

Electronic waste (e-waste) is any types of electronics that have been discarded or is in non-working condition. E-waste contains precious metals like gold, aluminium, silver etc., and toxic substances like mercury, lead, cadmium etc., which are very harmful to environment and human health. Nowadays, the e-waste problem has grown faster, while the lifespan of these products has become shorter. In a shorter time, the electronic product becomes waste. Due to the lack of awareness, most people dump the e-waste anywhere

or keep at home storage. Very few people sell it to the recycler. (Priya 2018, 1). This has created a new environmental and sustainability challenge. Electronic products' lifespan became very short due to technology advancement, human needs and business needs. Consumers tend to change their preference quite often. The fears competition between products also contribute to over production resulting un-sustainable use of resources.

Big corporations are trying to control the market and even create unnecessary demand resulting to the increase in waste amount. For example, some brands produce printers which can be bought with very reasonable price. However, their target profit is generated by selling specific inks cartridges. Their price of the ink is sometimes higher than buying new printer with half-filled ink. This makes consumers to dispose the older functional printer and buy another one. These kinds of wastes sometimes do not get to the correct facility to be recycled and the impact will be devastating.

An important material, which is also in households all over the world and found nearly in all products, is plastic. It is one of the important materials that is used all over the world. Unfortunately, because of the waste problem it is hard to see its benefits. According to Subramanian (2016, 35), the generation of plastics waste has been stimulated by the increased production coupled with increasing population, and it is responsible for the remarkable part of the present environmental crisis. The rapidly increasing demand and production of plastics has led to increased pollution and the replacement of many non-plastic items in the marketplace. Every year, a large amount of plastics waste is generated worldwide. However, waste plastics data are lacking from many countries.

Some countries are trying to manage, educate or ban plastic products within their territories. Packaging industries also are trying to create more sustainable way of plastic use. According to Subramanian (2016, 35), the solution to any plastic waste problem must be defined both qualitatively and quantitatively. Using expert knowledge, plastics waste can be transformed into materials which can be re-used in a wide range of practical applications. Nowadays the product idea is to keep it cycling if possible, to re-use, re-design etc. which should be both technically and economically feasible.

3. METHODOLOGY

The purpose of the methodology is to use some procedures to compile, process and analyse information about the topic, in this case the need for the driving force of mitigating climate change for outsourced products in developing countries. It will be a critical way of looking into realities than what is communicated by the companies. The theoretical concepts and key literature were presented in the previous section in a general form and specific ways.

This thesis is descriptive in nature. It means that it attempts to define and explore climate change problems form outsourcing manufacturing point of view and provide new areas to investigate for future research. Generally, the listed climate problems result from various causes and this attempts to point out and discuss about the loophole of the outsourcing manufacturing.

3.1 Research approach

Qualitative research approach is used for this thesis. Case study is a method to show examples of which is very well known as a location of the outsourced manufacturing. The chosen country is China with its electronics products and e-wastes. Other countries experience will be covered also in relation to China’s production supply chains. Due to the cost reasons some of the manufacturing are being outsourced to other least developed countries. In addition, scrambling for natural resources even extends the supply chain of products at an alarming rate. The following table summarises added research approach.

TABLE 1. Summary of the research approach

Research approach and method	Qualitative method by the case study
Objectives	To map current • Global climate change problems • Global business realities regarding climate change • Developing & developed countries experiences in mitigating climate change • Sustainability • Consumer consumption as a driving force for unsustainable production.
Data sources	• Literature • Newspaper articles and NGO reports about hidden manufacturing practices • Country and company report on manufacturing practices
Outcomes	• Possible recommendations • Initiation for future research • Conclusions

3.2 Case country and product discussion

The case country for this thesis is China. In addition, the thesis will investigate electronic products to explain the situation of climate burden through raw material sourcing, production and disposal of products. Although China is the second biggest economy in the world (World Bank 2008, 3), it still considered as a developing county based on the common parameters of identifying being developed or developing. There are multiple reasons why I chose this country for the thesis. First, China is one of the top producers of the electronic products both as finished product and as a component manufacturer to multinational companies. Second, due to the development in the economy, its own consumption behaviour is going towards to situations of the developed countries. Third, it has been one of the damping sites of hazardous e-waste from abroad and fourth, China outsources its own

manufacturing to other less developed countries, which have even worse capacity for the sustainable production.

China is also being punished with its own success. Like any other developed countries, China is depending on conventional energy sources like coal and natural gas as known carbon dioxide is the main byproduct of burning fossil fuel. (Halder 2011,13). The focus on economic growth at any cost to the environment is still in the rise. Countries need to find new ways to produce sustainable energy. The renewable energy (RE) sources are in the developing stage but increasing rapidly in many countries. China understood the climate problem and some mitigations has already begin to be implemented at a slow pace. China is today the world's largest exporter of electronics products. (Assche & Byron 2010, 1). According to this article, being exporter has two directions. The first is to make all things in house and to sell it to other, and the second is to import items and finish the product and sell it out. Our intention hear is to check how the environmental regulations can be performed while using different ways of electronics export. Naturally, it is hard to find every raw material in one place for the production.

China has most from the electronics production transfer and its share of the world production has more than doubled in the past decade (Electronics Weekly 2014, 18). There are different reasons for the increase of production and export of electronics products. The first thing that came out from the media was the cheap labour that China offers. However, our intention is to point out the angle, which is to have less environmental regulation on production. That also contributes to the low-cost production inputs for electronics. The developed countries now prefer to design product and take it to China for manufacturing. This blur the picture of the climate change as China did not put strict environmental regulations to control the manufacturing processes.

Electronic products frequently become obsolete due to the rapid technology development. In general, new products are being introduced at a faster rate than the current products are being discarded. This is a growing concern for the equipment manufacturers and for the government regulatory organizations such that their adverse environmental effects. In this regard, the product sustainability plays a major role in its long-term aim of conserving resources for the future by the design and manufacturing of sustainable products (Silva et al. 2009, 335). China is benefiting from this change and, at the same time, faces challenges. The economic benefit is undeniable. However, the country needs to be prepared for the next production starting from sourcing of raw materials, facilities and labour.

The growth of Chinese production and export of electronics resembles a shadow cast not only by the Chinese economy alone, but also by an aggregate of all economies along the global value chain. It is sometimes understood China as a last link. To a significant extent, the recent rise of the Chinas´ role in world trade must be viewed as part of the growth of the global value chain, apart from the Chinese imports needed purely for the rising domestic consumption. Furthermore, the expanding Chinese role in the supply chain is, in turn, the outcome of the technological advances of the present day. (Tung & Wan, Jr 2013, 3). This statement clarifies the involvement of other countries along the value chain. China is acting like an outsourced manufacturer for the products. Other countries will subcontract from China and supply raw materials and semi processed items.

Sustainability is compromised by different stakeholders along the supply chain. Breaking down the sustainably of this continuous manufacturing of electronics, we find different elements, and this will help us to understand how every step is Important. According to Silva Et al (2009, 336), there are six major elements in sustainability. Out of those, three will help us to breakdown outsourced manufacturing. Those are environmental impact, recyclability/re-manufacturability and societal impact. The first two are directly related to raw materials and forms of energy and manufacturing process. Furthermore, societal impact is also important as most of the outsourcing manufacturing is given out to the developing countries, which are vulnerable with little support from labour legislations.

Environmental impact covers the way how raw materials have been utilized, type of energy source used for the production, regulations on the production process and disposal of by-products. For example, rare earth metals are important component for electronic materials. According to Morrison & Tang (2012, 6), rare earths are not “rare.” Rather, they are relatively abundant in the earth’s crust. At the same time, however, they are highly scattered and are usually found as mixed together in other deposits, which makes it difficult to find rare earths in a concentration high enough to be mined and separated economically. When rare earths are extracted from the mine, the ore containing the rare earths must go through complex separation processes to produce each individual element. It is the separation process that largely drives the cost of the rare earth production. Rare earth deposits often contain radioactive elements, which means separating the metals requires costly and strenuous processes, that produce several toxic pollutants and hazardous waste materials.

The second element of the sustainability is the recyclability/ re-manufacturability. This element is signifying how to reuse part of or all materials in another form on next production cycle. Linear use of raw materials will not last for the next generation and the concept of circular economy is initiated. According to (Galalud & Laperche 2016, 21), the traditional economic model of industrial activity is in which individual manufacturing processes take in raw materials and generate products for consumption. However, the proposed system is optimizing the energy and material use, minimization of wastes and the effluents of one production serves us the raw material for another processes. In our example case, electronics like other products is being dumped once used. Furthermore, the life span of electronic products is becoming very short. Some products like mobile phone is becoming obsolete within short time and excess production is becoming a problem. The logic is the world is wasting raw materials in a linear model of production for items that got obsolete within short time.

Disposal of e-waste is an emerging global environmental issue, as these wastes have become the most rapidly growing segment of the municipal waste stream in the world. Informal workers do most of the e-waste collection and recycling in cities throughout China. E-waste recycling work provides livelihoods for migrant workers and the urban poor and has formed itself as a well-established shadow economy. The improper dismantling and burning of e-waste for resource recovery exposes workers to toxins and heavy metals, and causes severe air, water, and soil contamination. The illegal global trade of e-waste makes it a transboundary environmental governance problem of local and global scales. In addition, weak e-waste legislation and social marginalization are also major barriers to protecting e-waste recyclers and the environment. (Orlins 2016, 1).

E-waste disposal is difficult to stop when it is a source of income for some people. Even if the economy in the developing country is big, there are still vulnerable portion of the population, which does not benefit from the business in general, but does the informal dismantling for the sake of survival. Therefore, China can be regarded as a big problem. By overlooking the current state, the country will pay high price in the future for cleaning the e-waste from the soil and water.

The third pillar of sustainability is the social impact. In the electronics manufacturing industry, the society is being harmed from two perspectives. The first is the hazardous waste, which contaminates the air, soil and water sources. The second is the workers themselves at the production site. According to Smith et al. (2006, 66), in a bid to lower operational costs, safety standards are often ignored. This also is due to weak inspection by the authorities, who are more interested to attract investments by offering low cost work force.

Chemical poisoning is very common in these factories and some other occupational diseases. The outsourced manufacturing might create jobs for those, who really needs it, but at the same time compromising their health and eradicating human dignity.

The current and future situation will be as follows: either the Chinese companies or the western companies will investigate other countries, which can process hazardous raw materials and bad manufacturing practice to keep the cost as low as possible. The unfortunate reality that business and greediness will continue to push poor countries to follow harmful manufacturing processes.

3.3 Impact of outsourcing manufacturing in case country China

Since the industrial revolution, outsourcing (previously called sub-contracting) has helped thousands of companies to achieve profitability through increased efficiency. Clearly it is often in a firm´s best interest to outsource certain tasks and use the abilities of its remaining in-house workers in other, more productive activities. However, until recently, pro-outsourcing companies have neglected the failures of outsourcing due to corruption, cultural differences and reckless attitude towards the people's welfare and environment. (Brown & Wilson 2005,10). These statements clearly describe the sanding point of this thesis. It should not be reflected that outsourcing is a bad experience. It is indeed very good, and it was created from necessity and touch everyone around the globe. The main aim of this thesis is to investigate and list out the bad practices of outsource manufacturing related to environment impact.

In addition, when transferring manufacturing to cheap labour country like China, companies are outsourcing potential environmental problems to that country. For example, if a product manufacturing has bad environmental impact and requires special equipment or processing to prevent pollution, the product owner only must send the work overseas and the potential environmental problem go away temporarily. (Little 2008, 58). Companies are stating how their corporate social responsibility actions are proceeded, but mostly in the form of annual reports or when confronted with environmental pressure groups. The reality is that people in China are struggling with bad air quality, soil and water contamination.

It is often assumed that manufacturing workers in the developing countries, as implementers of outsourced jobs, would achieve economic benefits and organizational power. The job growth in the developing countries through outsourcing to competing firms has often actually resulted in declining wage rates relative to traditional thinking of higher ben-

efits. (Anner 2011,1). Although, this outsourced production like electronics, makes China benefit as a country, but the wealth is in the hands of government rather than of individuals. It cannot be denied the meaning of it has brought to the country. The harmful side is once wedge of labourers increases, companies is going to look elsewhere for cheaper options both inside China and in other countries. These results only temporary benefit for the poor workers.

Coming back to China´s growing environmental crisis, it is important to ensure that China has enough resources to meet its needs. On one hand, China is going to rely on rare earth metals to favor technologies in sectors such as renewable energy and electric vehicles to respond to worsening air pollution and the climate change. The devastating pollution caused by the production of rare earths itself has become a crisis, that the country no longer ignores. For instance, producing 1 ton of earth metals also produces 75,000 liters of acidic wastewater and one ton of radioactive residue. All this give rise to the toxic water system, barren farmland and growing number of cancer villages. (Seaman 2019, 28).

Since the mining process needs substantial amount of energy, it is advisable to investigate the source. Like any country, China is struggling to have sustainable renewable energy. Their decision is to use coal and fossil fuel, which are well known for emitting excess carbon dioxide. According to Thurber & Morse (2015, 37), coal is the major energy source that fuels economic growth in China. China has abundant coal, but far less oil and natural gas. Alternatives, such as hydropower and nuclear power, cannot keep pace of the economic growth due to their high capital cost and the controversy issues like relocation of populations, ecological degradation and safety. Therefore, almost 70 % of energy in China, comes from coal. According to Dan & Hongliang (2013, 11), coal consumption results to serious environmental problems including acid rain, ozone depletion, fine particle pollution and green house gas emissions.

Coal is also found to be cheaper source of energy. One of the outsourced manufactured input is energy. The aggregate effect of raw materials, labor, energy and production facility, is a must to insure lowest possible cost for the end user. This clearly demonstrates that environmental impacts are not priority in choosing an energy form to use for manufacturing of electronics or other products.

The notion countries like China are thinking should they worry about the environment once the country becomes developed and its population’s living standard is improving. There are two side effects for this approach. First, the climate change will punish us before reaching the developmental goals. The ambition to become as a developed country will be in jeopardy, if we keep on abusing the environment, like we now do. This leads

overconsumption of lower cost energy sources like coal. We can show that the thinking is not working as the developed countries are still using coal late alone the developing country like China, which is striving to take economic dominance. According to Miller (2005, 33), there is still coal energy produced today in the United States. Let's keep in mind that, the United States is one of the most developed nations, which outsource lots of manufacturing to China to minimize cost and pollution. Even with all that wealth, it cannot be changed to the cleaner renewable energy sources.

The second side effect of "lets update our energy source and production" is China´s own success. According to Barton et al. (2013, 1), the explosive growth of China's emerging middle class has brought the sweeping economic change and social transformation and it's not over yet. The growing middle class brings prosperity and increase in consumption. The country will find it hard to balance the local consumption and keeping the outsourced manufacturing products like electronics available for global market. China cannot abandon its production as it slows its export and income. China will be outsourcing by itself to other least developed countries. This can be in raw material extraction or even partial production of items. The next section of the thesis will cover how China itself outsources its raw material extraction and gets semi-processed items to be made as finished goods.

E-waste management has also been a headache for China. According to the International Labour Organization (2015, 5), there are illegal shipments to China form different countries. These electronics dismantled and try to recover as much as possible. The rest is dumped in landfills or burned, which create more pollution. Furthermore, China by itself consumes lots of electronics and create massive e-waste in addition to that what it receives from the other developed countries. Consumers in other parts of the world might think, that they did good by taking their electric appliances to collection centres but might not have an idea where that would end up. The lack of strong regulation from governments of the developing countries and lack of morality from the developed countries cause to people steep price, especially to the most vulnerable ones.

The following picture shows how people are engaged in salvaging electronic products to its component. They will scrap everything they can to recover important elements. However, they can use improper extraction of materials like burning part of the product. This emits unwanted substances to the environment. The workers are from China and migrant workers also goes to these sites looking for a job. Environmental and societal impact is beyond imaginable.

Picture 4. Shanghai Saturday (Creative Commons, Creator Ramko Tanis)

Source: (https://search.creativecommons.org/photos/8675010c-671a-4bb8-91a3-ad557c65c716)

4. Empirical study and analysis

The empirical study and analysis chapter reveals the explanation and tries to answer to the research questions. The main idea is to give emphasis on outsourced manufacturing in the developing countries. Furthermore, the thesis explained the overall emergence of the global supply chain since the industrialization era. These created demand in products and pushed companies' and governments to utilize outsourcing to minimize production costs and increase profit. Now the developed world speeds up consumption and the developing countries try fully to cut costs and to be competitive in filling the demand. This creates burden and has started to slow mitigating the climate change. Because of the poor regulation, some corporations have become more powerful and managed to hide the situation and this has been supported by the developing and developed countries.

Putting it to the perspective, this is an individual assessment of the current situation. There is another side of the story: how the developed countries argue that they are giving an opportunity for the least developed countries when taking them to be a part of the global value chain. However, they do not explain at what expense the proposed prosperity is coming. There is undeniable fact about economic changes in the developing and least developed countries with a short-term gain. Some countries are doing it for survival and

others are doing it to concur power and be dominant. During this time, the climate burden is being put aside with less emphasis than it should get.

4.1 Research question answers

The research questions are answered in this part of the thesis. The answers magnify the importance in business to focus on mitigating climate change. The emphasis given to specific topics like outsourcing seems to be less than it would be needed. In addition, answering to the three research questions show the cause and effect relationships of the stakeholders' operations in prevention the climate change locally. The research questions were outlined starting from identification of responsibility for the global climate change, the emphasis of outsourcing and how does the sustainability is considered in case of outsourcing to the developing countries.

Question 1. What factors affect climate change that can be driving force for outsourced manufacturers?

The global climate change is not a new phenomenon. It has been existing and will continue to be a hot topic in the future as well. The climate change is being felt by its effects. It is not just an assumption by a group of people. It is rather a change in the atmosphere resulted from the imbalance of components. Less attention has been given to the climate change as the effects takes time to be reviled. It has taken a generation for some effects to have been noticed. Since, industrialization changed how things are produced and consumed, the time to see the effects is becoming shorter than before.

Production and consumption across the globe succeeded in finding cheaper and abundant resources to meet the increasing demand. By nature, different countries have different components for production. These leads some to advance with capabilities and be dominant in the markets. When handling this development trend, some countries managed to become as a part of the global supply chain. This helped them to be competitive in the market and brought economic benefit.

Outsourcing manufacturers seem to be found in the developing or least developed countries. These countries have cheap energy source, labor, raw materials and easier transport access. What we discovered from the literature, with all these competitive advantages, these countries are vulnerable to the climate change effects like increasing water level, increasing temperature, flooding, release of toxins to the environment, and, are not still capable to tackle these problems. The developed countries are more advanced and understand the effects of the climate change. They use the opportunity to outsource their manufacturing and try to decrease the firsthand effect.

China has been served as a case country of this thesis. China has been a good example for multiple things, in good and bad ones. The good things are related to becoming economic power and improve the welfare of the part of the population. However, they are doing much harm to the environment with just focusing on the economic growth. Although China starts to recognize the bad effects and try to tackle some of the problems, it doesn't seem it will be a key factor for improvement.

One factor affecting outsourced manufacturing is the use of the cheapest possible energy form, mostly coal, but not cleantech energy. The firsthand reason for this is the lack of the necessary infrastructure in place or the slow return on investment of clean energy. One of the competitive advantages of China was keeping their production cost low and by that to beat the global competition by using energy sources like coal. In our case the example of electronic products is the part of the same competition. Keeping the cost low creates more demand of electronics within China and the global markets. These products are available at a cost, which speeds up consumption resulting harmful effect to the climate.

Realistically, the case country China and other developed countries do know the factors affecting the climate but are not ready to mitigate it. This cannot be an excuse for the future actions. The developed countries have realized how bad their actions in production has been and decided to act, at least to some extent, in mitigating the environmental impact. The developing countries need to wake up earlier than the developed ones because they are losing their clean water, natural resources and adding an increase in population. The action should be taken as fast as possible.

Question 2. How does the outsourcing production contribute for the climate change?

The second question is an extension of the first one. The climate burden is a consequence of actions by the different stakeholders. Classification of the stakeholders can help to shed light on the kind of action needed to mitigate the climate problem. The stakeholders categorized are the developed countries, consumers, big corporations, the developing countries and the least developed countries.

The developed countries are suggested to have both the initiation phase and power to mange an increase in the environmental burden. These countries are industrialized and changed their economy and consumer behavior during a long time. Since, their way of consumption level leads the market in different economic situations, it is generally believed that they have a strong governmental structure and monitoring of the environmental impact of industries. However, outsourcing has been found to be a cheaper way of getting products and to push away negative side of manufacturing process. In my opinion, these countries are trying to solve the problem within their territory, but ignoring the fact, that

their big corporations are acting badly in other developing countries. Furthermore, now there is also emerging situation how the countries are consuming fossil fuel as the main energy source.

Consumers in the developed countries and in some extent in the developing countries have increased the consumption level of products. Consumer behavior is pushing companies to produce different items in a faster pace. In our case, the life cycle of an electronic product is continuously shortening, it becomes obsolete and/or gets broken rapidly. Consumers are already used to change the products in a short notice. The case country China has been struggling with domestic consumption of electronics since part of the population can afford to consume more. E-waste is one of the growing problem for the environment and the pace of recycling and reusing of electronic products are way behind compared to the change in production technology.

Big corporations are responsible for creating monopoly and dominance within their country of origin and in outsources production sites in the developing countries. There is nothing wrong in expanding business or being dominant in the market. The problem comes on how they try to get things done. In the electronics industry, corporations even have an influence on environmental regulations stipulated by the governments. Corporations can push outsourced manufacturers and the developing countries governments to come up with a product with lowest possible cost in the markets. Attention to lower costs leads to using cheaper energy sources, cheaper labor and toxic materials. These companies' main goal is to maximize profit, which is one of the reasons for the climate change.

The developing countries are puzzled on how to balance economic growth and the climate change. Developing countries' ability to implement environmental regulations is minimal. These countries are desperate to eradicate poverty by any means. Although, this behavior was also with the developed countries before the certain standard of living was achieved. The political decision is being influenced by the big global corporations and sometimes it is difficult to accept actions of its own citizens. Information on work and climate conditions are mostly covered from the media and non-governmental organizations standing for the climate change. The case country China has been one of debatable countries because of its manufacturing process and labor laws. Electronics production became both a benefit and a curse at individual level and country wise.

Least developed countries are even in a bad situation in implementing the climate change mitigation plans. These countries are struggling to withstand economic and social problems and are in no position to fight against the climate change but are still part of the global value chain. The next frontier for cheaper production might end up in these coun-

tries and the climate chaos will continue to grow. In our example product, electronics, it was mentioned in the literature, how dangerous toxic materials are released in mining and preparing rare earth metals. These items are being extracted in the least developed countries as well and it can be imagined how this pollutes the environment. These countries are not yet capable of tacking the problem nor cannot afford to give up the production. Although, this might look like a local problem, but it will soon become as a global one.

To summarize, outsourcing as such is not a problem by itself. It is the act of the stakeholders, which has created more climate burden. The interlinkage between the factors help to show, that it is not a blame game, but a disaster that needs to be fixed. Attention needs to be paid to the statements not to generalize without substantial facts. According this can be a trigger for bigger and deeper research.

Question 3. How does sustainability issues matter to outsourced manufacturers in the developing countries?

According to Gonzalez-Pirez & Leonard (2017, 26), sustainability includes the concepts of economics, social justice, environmental sciences, management, policies and regulations. This third question considers how the literature defines it and its interpretation by outsourced manufacturers in the developing countries. To get a clear picture, we take our case country China and electronics products with the elements of sustainability. This is also a comparison on definition and actions where data was not collected on specific locations.

We start with an important element related to the thesis, environment. The environment is burden with e-waste that has been discarded without careful attention. In addition, illegal recycling of the products in China, created lots of environmental pollution and social injustice to the people working in the sector. The main intent of the sustainability has been looking into the future with conscious production and consumption of products. There are many reasons for this, but the core reason is that many people must make their living. Living with bare minimum income is a priority compared to an environmental impact. People join the workforce just for survival. It is bad decision both socially and environmentally.

It is easier to handle the picture of the outsourcing production. However, the government within the country and the big corporations are giving partially a blind eye to what is happening. End-users at the other end, gets flawed information on how the used product has been produced. Normally, people do not investigate things by themselves to check how the sustainability was considered in extraction, production and transportation of the product.

Sustainability as a word is becoming an everyday expression but those in charge of implementing, don't act accordingly. For example, governments in the developing countries, where outsourced manufacturing is common, are the same who write the environmental legislation and give production permits. However, that seems to be the last phase to have controlling function. All the environmental problems, which are happening, are not secret for all. They are in a situation of loosing the business income for the country, if they strictly enforce the rules, which can increase cost of production and lowers competitiveness. The case country China waited so long to advocate for sustainable production and use of electronic products. They waited until they bit the competition through lowering costs at the expense of the environmental pollution.

Unsustainable consumption of electronic products has been rising within China itself. Outsourced manufacturing companies can see this an opportunity to increase their production, which, at the same time, results more use of non-renewable energy sources and an increase in e-waste. These actions of manufacturers are affecting water resources, farmlands and air quality. No matter the income of manufacturer increase it is not possible to recover the environmental costs and consequences in these reckless actions. The investment needed for clean-up most probably exceeds the revenue generated at a manufacturer level.

Sustainability helps in the long run with scarification's in the sort term. However, outsourced manufacturers, like the case China, find it hard to invest a lot in advance for environment protection. Companies find it difficult to aim for long-term benefit while being in a harsh competition over the current production. This holds true for our example of electronic products. Even bigger manufacturers rather invest in the next generation product inside to the raw materials, production process and waste management. The fast pace of electronic products pushes the companies not to plan for long term. The need to win the current requests becoming a matter of existence. This shows how little emphasis is given to the sustainability.

To summarise, sustainability issues are not getting the necessary attention as they should. Many reasons can be listed by those stakeholders responsible for implementation, but this would not prevent sufferings of the global climate challenge. Sustainability is not only a single hand activity rather it is a continuous activity along the supply chain of products in a global scale.

4.2 Discussion of thesis objectives

Objective 1. Examining the current climate change from outsourcing of products to the developing countries

While consulting the literature, the current climate change is first actions of the human and natural occurrences. Second, it comes with current production and consumptions of goods. Human action by use of cheaper and available energy source created greenhouse gases which accelerated the climate change. The current production is responsible for the operations along the supply chain in the global context. In our case, China´s electronics production is in the second category and causes the harmful contents and emissions. Some of the climate change effects started to be visible faster than previous experiences have done. For example, poor air quality, soil contamination and toxins in freshwater reserves.

The objective of this thesis is to magnify the problems and create awareness and responsibility for the future action. Lots of publications have been realised concerning the climate change burden, but the implementation of the action plans seems to go slower than the rate at which outsourced production is affecting the climate. The issue might be everyday concern in the developed countries and maybe only locally, but these countries are involved on what is happening in the developing countries now.

I believe this kind of study outputs are also helpful in disseminating information to increase consciousness how to struggle against the climate change. Afterall, an aggregate action can save the future. Of course, there are still challenges to be put together, e.g. local priorities of countries in different economic situation to recognize the importance of environmental protection. However, it is important to know the effect of the climate change goes beyond borders with the increased knowledge of the economic and social impacts.

Objective 2. How is the developed country´s consumption trend?

According to the scientific literature, referred in this thesis report, the developed countries have been increasing their consumption at an alarming rate. Products using linear model of productions are favoured and discarded easily with less intention of how it can affect the environment. An increase in income and prosperity brought an excess demand for the products. Businesses are led by the idea of the ever-increasing demand and production. It can be inferred how the less population of developed world are consuming more than the larger population of the developing countries.

Our case product sphere, electronics, is following the business-driven technology development, which causes harm to the environment. Per capita consumption of electricity in the developed world is always on the rise and the source of this electricity are not yet converted to the renewable sources. This means the use of unsustainable electronics product by the unsustainable electricity production. Although, modernization increases production efficiency, the trend is showing an excess use of the items produced. Realistically it was supposed to be lesser consumption of the products.

E-waste is an inevitable because of the continuous update of products. Examples were given on how the developed world is “getting better” in collection of e-waste and export it to the developing countries for recycling. Consumers think they did good by taking e-waste to collection centres, but they do not have any idea where it will end up. They just feel good and continue to consume as they rely on the collection system as the marketers have convinced that the waste is taken care of. E-waste is dumped in a landfill or recycled in a poor process and conditions and it will still contaminate the environment. Responsible handling of all involved must be promoted to help the mitigation of the climate change.

The case product was only one example among tens of thousands of products. The energy consumption of the developed countries keeps on rising even after outsourcing manufacturing to developed countries. These countries are still using energy sources like coal, which is categorized as a high carbon emitting substance. Furthermore, the use of fossil fuel is still higher than expected compared with the option of renewable energy. An electric car has been listed as a good example to replace fossil fuel run engines. It is welcomed by lots of conscious consumers - sometimes forgetting the electricity used for charging are coming from a coal running facility. In addition, batteries still have problem as they consume huge amount of valuable metals and the development work has not yet solved this.

Higher consumption of goods goes in hand in hand with packaging of itself. Plastic has been one of the controversial and useful packaging materials. Plastic and its environmental disaster do not seem clear for some people as it is being the cheapest form of packaging. Adding plastic waste to an e-waste suffocates the environment. Until now recommended material replacing plastic is either expensive or difficult to get. The developing countries are now also producing this waste which makes the problem very difficult.

Higher earnings push people to own lots of things that they do not use daily. The sharing economy is becoming popular to facilitate the use of products in a smart way. Renting and services in general can help the environment rather than everybody would own the same equipment. There are still people, who are convinced, that with less use of products they can protect the environment and still prefer to own.

In summary, the global consumption of products is undermining the sustainable way of living. The threatening thing is coming in front of us. When an economic situation of the developing countries is getting better, there will be another wave in increase of consumption because of the growth of the population. The case country China already faces this problem. As soon as income of part of the population increases, consumption also goes up. The sustainable use of products shall be part of an education at early stage to save the environment for the next generation.

Objective 3. Sustainably issues and practices

Sustainability issues has been covered in the research question part. However, the objective of this statement is explaining the situation with third party certifications and international standards. Some flaws have been discovered in the literature and this is going to be one hot topic for the future research reports. International qualifications like the ISO standards are issued to improve the quality of the product and production process. However, once this certification is issued, continuous improvement by the established management systems might not guaranteed depending on the company. This is a voluntary and payable registration and companies do that partially to satisfy customers and their feedback.

A choice for Fair Trade Certified™ goods is a choice to support responsible companies, empower farmers, workers, and fishermen, and protect the environment (Fairtradecertified.com 2020, 1). In practice, consumers are paying extra to support the primary production and protect the environment. However, as magnificent as it seems, conformation of the output is in jeopardy. The least developed country's workers don't have any idea on fair trade programs and the middlemen are benefiting from this system. Least developed countries do struggle with corruption and mismanagement. This, indeed, needs a thorough investigation and research to make conclusions. It is a personal perspective originated from articles, documentaries and assessing the situation.

The length of the supply chain makes it difficult to identify the core problem. In our case products electronics, the situation is also the same. Raw materials are extracted from different locations, semi-processed, transported and transformed into finished product. All participants shall be in the same position to make similar effort in tackling environmental

problems. Unfortunately, they are in different parts of the world live with different priorities. The producers and sellers write a report on sustainably produced products. Companies collect information from various stakeholders including suppliers. It is difficult to depend on company´s sustainability report when it is written by themselves.

Big corporations are also making sustainably report annually. Corporate social responsibility is becoming a selling point for products to customers requiring sustainable products. I find it difficult to accept corporation's intension of sustainability while producing low cost products that are inefficient in resource use and promoting sustainability-this is hard to swallow. In the case product electronics, some products like mobile phones, are easily becoming obsolete and companies are competing with little modification to keep market share that results in lots of e-waste. Fortunately, there are activist groups and researchers, who observe continuously at least big companies. However, it still needs to be substantiated with evidence.

5. CONCLUSIONS AND RECOMENDATIONS

To sum up, this thesis investigated the attention given on outsourcing in the global climate change and how the climate change is taken as a priority among producers in the developing countries. According to the investigated literature, it is one way to influence stakeholders along the supply chain. When looking into the practices, there are the same reasons for the climate change in the developed countries with different motivation and action level that is a burden on the environment. The developing countries found to be more vulnerable for the climate change burden. The effects are seen more frequently and affect larger part of the population. For example, toxic water source, contaminated soil and occurrences like flooding are becoming more common in the developing countries. This affect them especially in the agriculture, which is a big part of their economy.

Outsourcing production´s contribution to the climate change is no different in types or location. It gets magnified as it is happening in the developing countries with many other economical and social problems. The literature explains how the developing countries ignore the environmental impact of their production by giving priority only to the economic development. This led outsourced manufactures to ignore the raw material extraction process, use of the sustainable energy sources, waste disposal and focus only on the cost reduction to be competitive. In the case country China, manufacturers focus was in dominating the electronics production market at any cost to the environment, they considered less attention to the clean-up the clean-up process might cost more in the future.

Sustainability is a powerful word, seems to get less attention from manufacturers in the developing countries. There were many issues listed in the literature how some countries are outspoken on choices what they have made just to survive and feed their population. Due to some pressure from consumers and NGOs, companies start to state how their products should be sustainable and environmentally friendly. In my opinion, this needs to be substantiated rather than putting the label on the products. Sustainability issues shall matter for outsourced manufacturers and they could benefit form it's effects.

In closing, decisions on the productions are guided by the consumer demand, market condition, financers and investors. The climate change mitigation is an aggregate effort from consumers, suppliers and producers. To safeguard the possibilities of the future generations, actions must start no later than now. The world now recognizes the arising climate change effect caused by our current and past activities. Things are going to get worse if we keep going like we do now.

This thesis is investigated information from literal sources and tried to find the amount of emphasis given to outsourcing productions effect on the climate change. Detailed research by quantifying the effects along the supply chain would help in addressing climate issues. Some of the suggestions are still in general level and difficult to implement in wide spectrum because of the different needs of countries. Different sectors have different approaches or solutions to common problems, too. Hence, to make it specific and target the problem, this thesis can be a starting point for a broader investigation and of several other field and country specific investigations concerning outsourcing manufacturing.

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